WHAT IS CLAIMED IS:

1. A transmission line monitoring apparatus for monitoring faults occurring in a transmission line and in apparatus which are connected to the transmission line, said transmission line monitoring apparatus comprising:

a first optical coupling unit which couples a down data signal of a first wavelength and an examination signal of a second wavelength so as to transmit a first coupled signal to a lower apparatus;

a first optical dividing unit which receives said first coupled signal from said optical coupling unit so as to divide said first coupled signal into said down data signal with the first wavelength and said examination signal with the second wavelength;

a second optical coupling unit which couples an up data signal with the first wavelength and said examination signal from said first optical dividing unit so as to transmit a second coupled signal toward a host apparatus;

a second optical dividing unit which receives said second coupled signal from said second optical coupling unit so as to divide said second coupled signal into said up data signal with the first wavelength and said examination signal with the second wavelength; and

a monitoring unit which monitors a fault and a location of said fault.

Sub B1

2. The transmission line monitoring apparatus as claimed in claim 1, wherein said first optical coupling unit, said first optical dividing unit, said second optical coupling unit, and said second optical dividing unit are formed of passive elements.

3. The transmission line monitoring apparatus as claimed in claim 2, further comprising a first examination signal generator which generates said examination signal with the second wavelength.

4. The transmission line monitoring apparatus as claimed in claim 3, wherein said monitoring unit includes:

an alarm information output unit which monitors a signal level of said examination signal with the second wavelength and, if said signal level is lower than a predetermined signal level, then outputs alarm information; and

an alarm information displaying/transferring unit which, when said alarm information is outputted, displays said alarm information and insert said alarm information into said up data signal to be transmitted to said host apparatus.

5. The transmission line monitoring

apparatus as claimed in claim 2, further comprising a second examination signal generator which divides an input down data signal into two signals, one signal being converted into said down data signal with the first wavelength, the other signal being converted into said examination signal with the second wavelength.

6. The transmission line monitoring apparatus as claimed in claim 5, wherein said monitoring unit includes:

an error information output unit which outputs synchronous error information and data signal error information based on said examination signal with the second wavelength; and

an error information displaying/transferring unit which, when said synchronous error information and said data signal error information are outputted, displays said error information and inserts said error information into said up data signal to be transmitted to said host apparatus.

7. The transmission line monitoring apparatus as claimed in claim 3, further comprising a first control unit which controls a start and stop of said first examination signal generator.

8. The transmission line monitoring

apparatus as claimed in claim 4, further comprising a second control unit which controls start and stop of said alarm information output unit and start and stop of said alarm information display/transferring unit.

9. The transmission line monitoring apparatus as claimed in claim 7, further comprising a timer for managing said first control unit at given intervals.

10. The transmission line monitoring apparatus as claimed in claim 8, further comprising a command detecting unit which detects a command signal included in said down data signal so as to manage said first control unit based on said command signal.

11. The transmission line monitoring apparatus as claimed in claim 9, further comprising a command detecting unit which detects a command signal included in said down data signal so as to manage said first control unit based on said command signal.

Sub a2 12. A transmission line monitoring method for monitoring faults occurring in a transmission

line and in apparatus connected to the transmission line, said transmission line monitoring method comprising the steps of:

(a) coupling a down data signal with a first wavelength and an examination signal with a second wavelength so as to transmit a first coupled signal to a lower apparatus;

(b) receiving said first coupled signal and dividing said first coupled signal into said down data signal with the first wavelength and said examination signal with the second wavelength;

(c) coupling an up data signal with the first wavelength and said examination signal with the second wavelength so as to transmit a second coupled signal towards a host apparatus;

(d) receiving said second coupled signal and dividing said second coupled signal into said up data signal with the first wavelength and said examination signal with the second wavelength; and

(e) monitoring a fault and a location of said fault.

add A3

add B1